Florida Department of Transportation

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STRUCTURES DESIGN BULLETIN C11-06

DATE:	April 21, 2011
TO:	District Directors of Production, District Design Engineers, District Structures Design Engineers, District Construction Engineers
FROM:	Robert Robertson, P.E., State Structures Design Engineer RVR
COPIES:	Brian Blanchard, David O'Hagan, Larry Jones, Andre Pavlov, Charles Boyd, Tom Andres, Sam Fallaha, Dennis Golabek, Jeffrey Ger FHWA
SUBJECT:	Requirements for Sizing the Moment Slab for Traffic Railings Constructed on Top of Retaining Walls

This Structures Design Bulletin implements new design requirements for sizing the moment slab (junction slab) for traffic railings constructed on top of retaining walls.

REQUIREMENTS

1. **Add the following new section to the 2011 Structures Manual, Structures Design Guidelines:**

6.7.10 Impact Loads for Railing Systems with Footings or on Retaining Walls [13.7.3.1.2]

For sizing the moment slab for TL-3 and TL-4 traffic railings constructed with footings or on to top of retaining walls, use the following methodology.

Sliding of the Traffic Railing-Moment Slab
The factored nominal static sliding resistance (φR_n) to sliding of the traffic railing-moment slab system along its base shall satisfy the following condition (see Figure 1):

$$\varphi R_n \geq \gamma F_{ts}$$

where:

φ = resistance factor (0.8, *LRFD Bridge Design Specifications* Table 10.5.5-1)
R_n = nominal static sliding resistance (kips)
γ = load factor (1.0, extreme event)
F_{ts} = equivalent transverse static impact load (10 kips)

The nominal static sliding resistance (R_n) shall be calculated as:

$R_n = W \tan \varphi_s$

where:

W = weight of the monolithic section of traffic railing-moment slab between joints (with an upper limit of 60 ft) plus any pavement or backfill material laying on top of the moment slab

φ_s = friction angle of the soil–moment slab interface (°)

Overturning of the Traffic Railing-Moment Slab

The factored nominal static moment resistance (φM_n) of the traffic railing–moment slab system to overturning shall satisfy the following condition (see Figure 1):

$\varphi M_n \geq \gamma F_{ts} h_A$

where:

φ = resistance factor (0.9)

M_n = nominal static moment resistance (kips-ft)

γ = load factor (1.0, extreme event)

F_{ts} = equivalent transverse static impact load (10 kips)

h_A = moment arm taken as the vertical distance from the point of impact due to the dynamic force to the point of rotation A

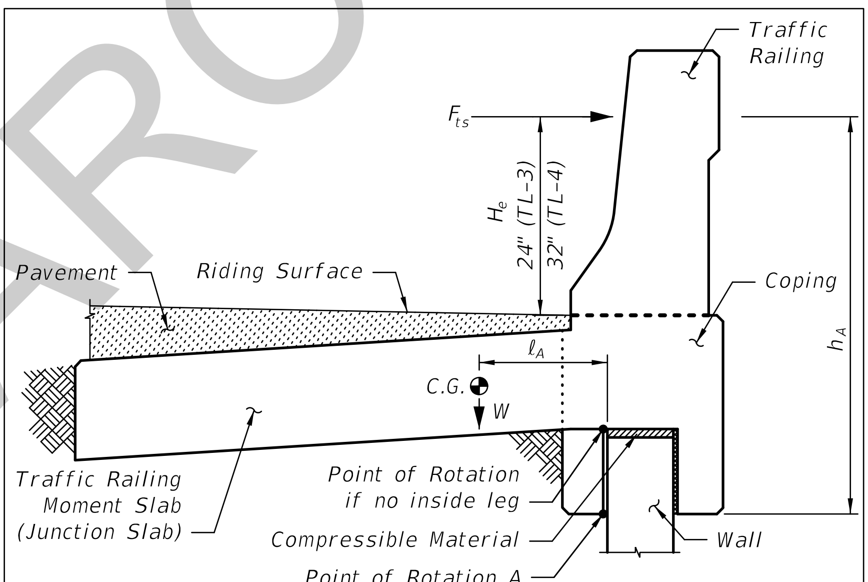
The nominal static moment resistance M_n shall be calculated as:

$M_n = W l_A$

where:

W = weight of the monolithic section of traffic railing-moment slab between joints (with an upper limit of 60 ft) plus any pavement or backfill material laying on top of the moment slab

l_A = horizontal distance from the center of gravity of the traffic railing-moment slab W to the point of rotation A



Traffic Railing - Moment Slab System
(Sliding and Overturning)

COMMENTARY

Research conducted as part of NCHRP Report 663, Design of Roadside Barrier Systems Placed on MSE Retaining Walls**,** concludes that a traffic railing–moment slab stability analysis using a 10 kip transverse static load provides for a sufficient design. The report also confirms that a 54 kip load is appropriate for the traffic railing structural capacity as recommended in LRFD Section 13.

BACKGROUND

The new guidance provided in NHRP Report 663 clarifies the design application of the 54 kip dynamic and 10 kip static impact forces and significantly decreases the width of the moment slab required. See Section 2.3 of the report for additional design information.

IMPLEMENTATION

Design Standards Index 5212, 6100 Series, and 6200 Series incorporating the revised loading were issued in January 2011 and effective for lettings beginning July 1, 2011. No project redesigns are required.

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